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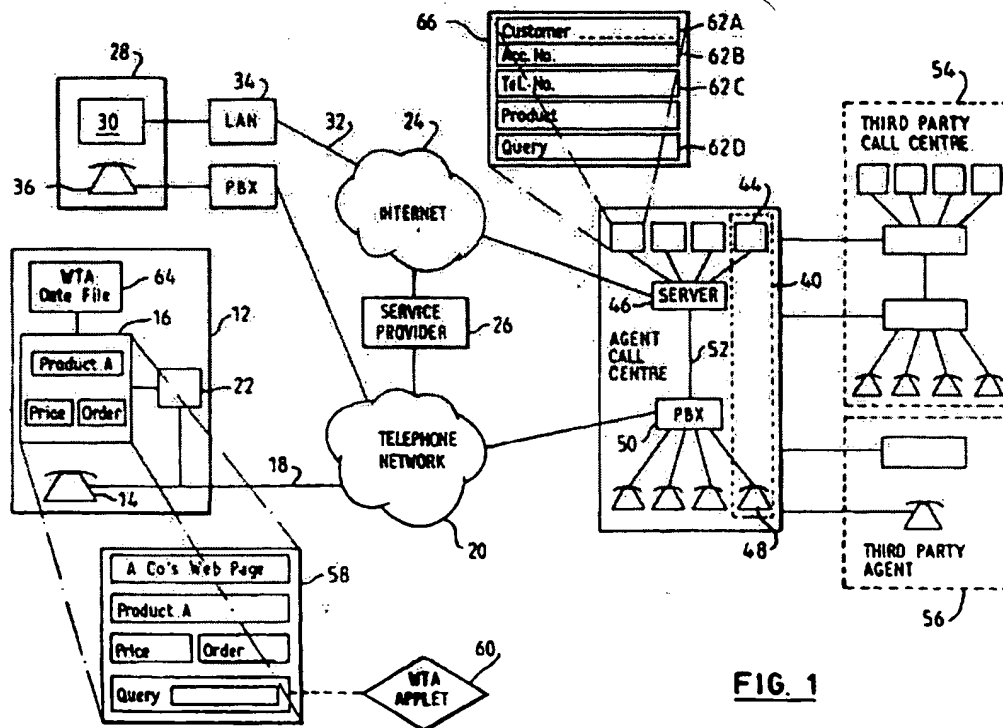
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(54) Abstract Title  
Establishing real time voice and/or video link via the Internet

(57) The user of a Web browser often requires assistance by the representatives (or agents) of the company which owns the Web page. A real time voice and/or image link between the user's computer and an agent's computer is achieved by downloading an executable program code (eg. JAVA™) onto the user's computer. When the user initiates the execution of the program code, the user's computer, under control of the program code, retrieves real time connection data from the user's computer and sends it to the agent's computer. The agent can then initiate a real time voice or image link with the user using the real time connection data. This saves the user having to manually enter a contact name, address or telephone number.



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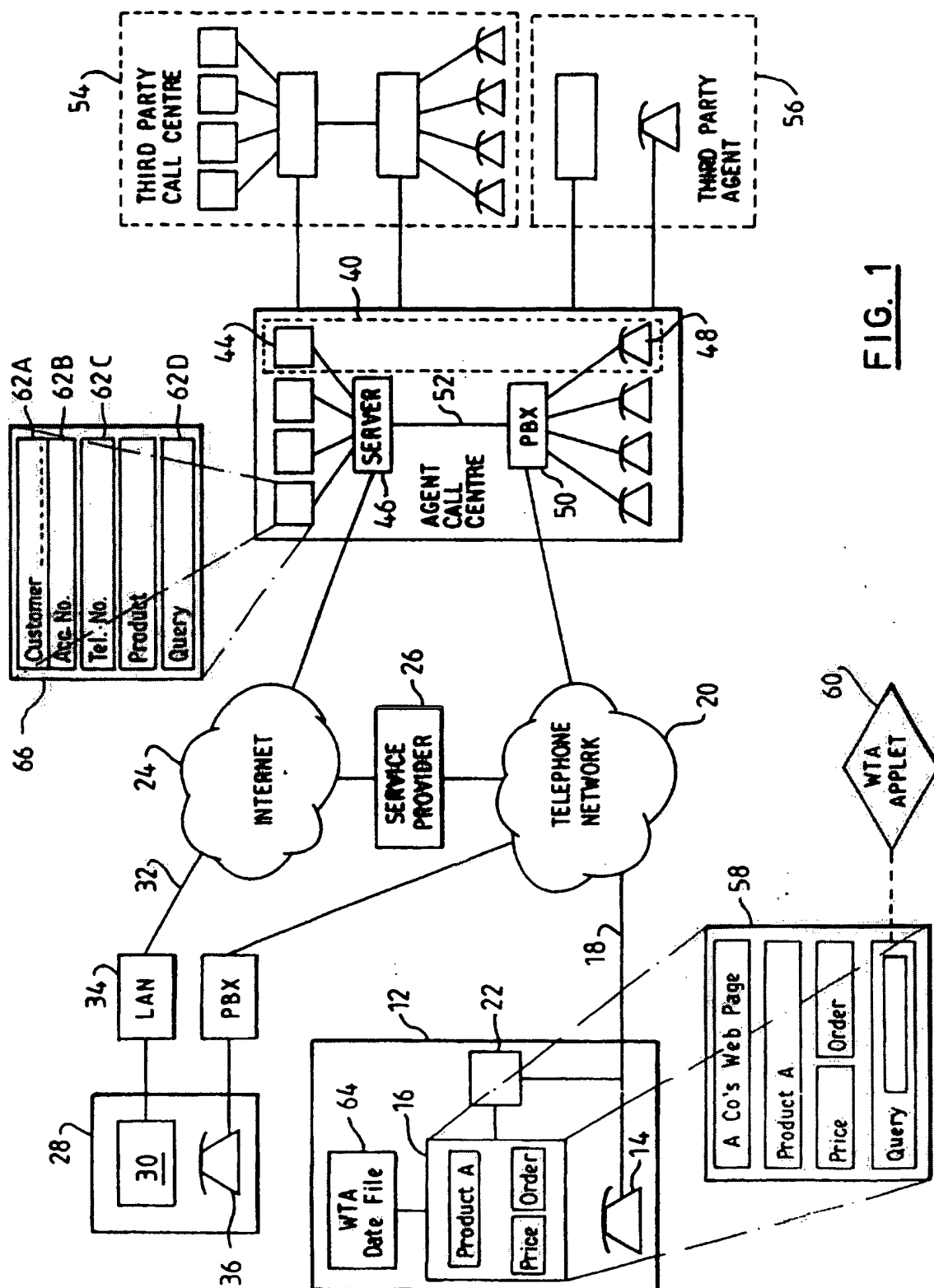


FIG. 1

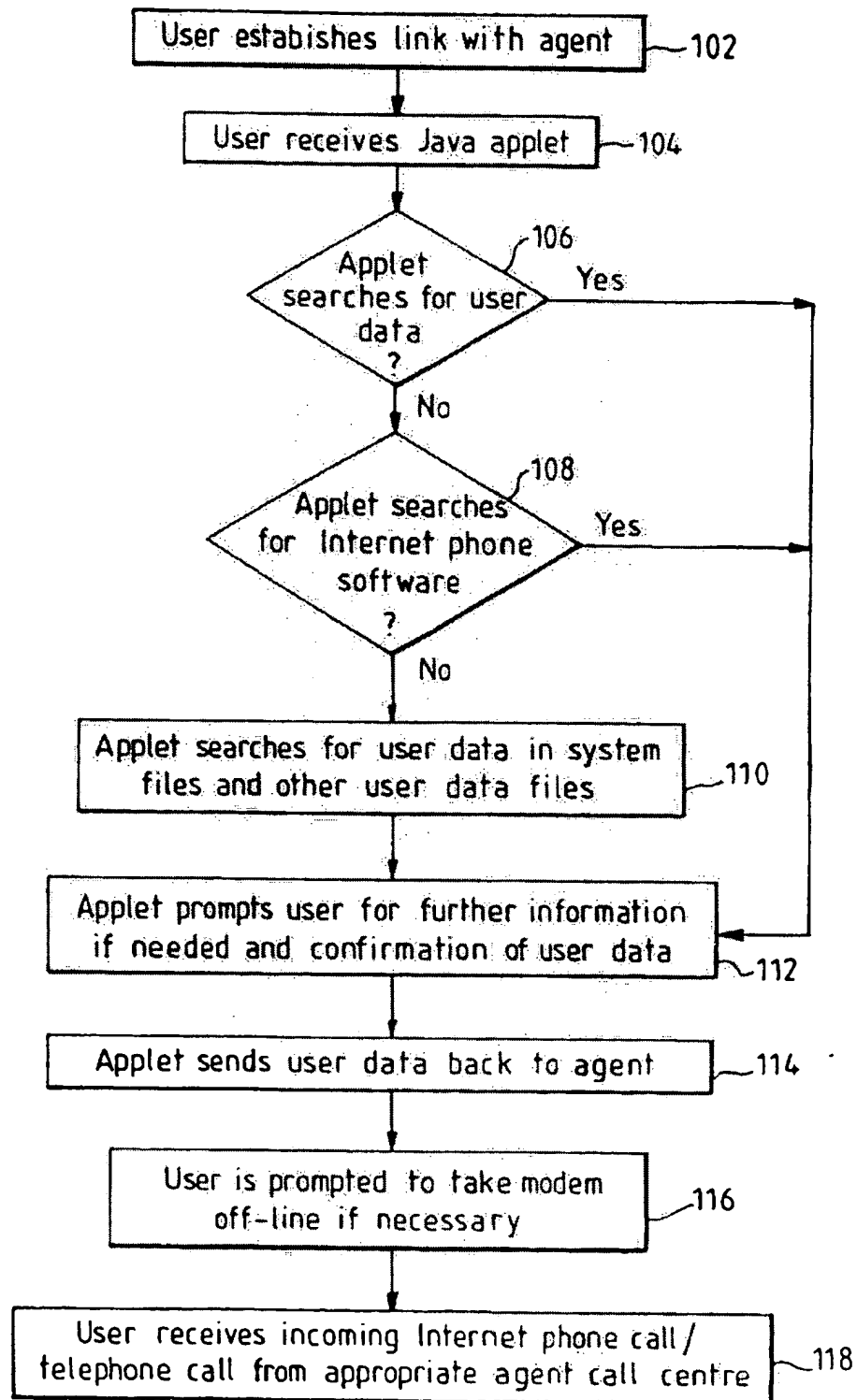
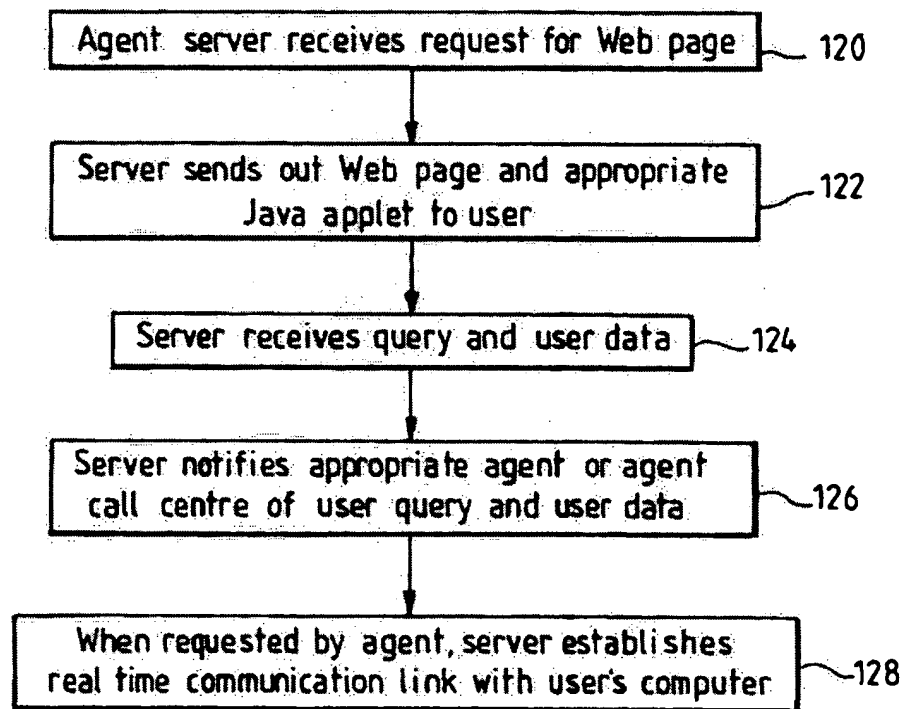


FIG. 2

FIG. 3

## WEB INTEGRATED TELEPHONY

This invention relates to web integrated telephony and is particularly relevant to business conducted over the Internet using the World Wide Web.

Companies and organisations are increasingly advertising their products and services on the Web by publishing Web pages which are stored on Web servers. These pages are downloaded by prospective consumers who then browse the Web page using personal or network computers which run Web Browser programs.

The user of a Web browser often requires assistance by a representative of the company which owns the Web page. This can be achieved by the user placing a telephone call to a number given in the Web page. The user may well then be faced with a series of selection instructions to enter numbers on the telephone keypad. These numbers generate DTMF tones which the company's Voice Response Unit (VRU) interprets and uses to find an appropriate available representative to assist the caller. During this period the telephone tariff is charged to the customer, or in the case of a 0500/0800 number, to the company. During peak periods the caller may be held in a queue for a substantial time before gaining contact with a suitable agent.

Once the customer has made contact with an agent, additional time is spent in discussing the appropriate Web page, and section thereof, and time elapses while the representative locates and displays the relevant Web page, and investigates the customer's query.

The current practice of publishing a telephone contact number also makes it more difficult or expensive to re-route the call to an agent located elsewhere, such as a consultant working at home. In some cases it is advantageous for a company to simply receive a telephone assistance request through the Internet, and locate an appropriate person, who properly briefed, can then return the call.

Another way improves the user friendliness by semi-automatizing the process using embedded formatting commands such as hypertext mark up language.

In this case, a user downloading a Web page using an Internet browser, the Web page showing a product or service on the screen. The user "clicks" on a control button or hypertext requesting a callback and a second screen is activated by the browser which has input spaces for name and phone number. The browser then sends the request when the user "clicks" on another control button.

After the user initiates a callback, the request is routed back to the Web page owners Internet server via e-mail/TCP-IP, which in turn sends the request to a Web unit that translates the Internet message and customer information into a predictive dial message (electronic copies of calls to make). An example of this is Rockwell Corp's Automatic Call Distributor.

This goes some way to speeding up a query but still requires input from the user which requires time and effort and is subject to delay and error. Moreover if the user is making enquiries from more than one company or in some cases more than one product the information may have to be entered again.

One solution is to store personal and business information in a recognisable and accessible format so that it may be sent to a business on request. This has been done in one form as an electronic business card as described by Versit on their Web pages but has not been incorporated into a communicating application. Full information instructing a computer how to make a real time connection with the user is not included in such a business card. For example, if the user only has one phone line and no Internet telephone he will need to disconnect when requested, if the user has an Internet voice phone or video phone the agent will need to know which type so that the correct protocol can be used. Other important information such as the Web page and the product detailing the query would be specific to that particular event and is not included in an electronic business card.

According to the invention there is provided a method of establishing a real time voice and/or image link between a user's computer and an agent's computer comprising the steps of: the user establishing a computer network link between the user's computer and the agent's computer and downloading executable program code onto the user's computer; the user initiating execution of the program code on the user's computer; the user's computer, under the control of the program code, retrieving real time connection data from the user's computer and sending the real time connection data to the agent's computer; and the agent initiating a real time voice or image link with the user using the real time connection data.

In this way the user minimizes the effort required to real time connection with an appropriate agent. The agent will have the advantage of previewing the query before contacting the user and so give a better response. Since the agent establishes the call, the user would not normally have to be burdened with the cost of the call.

Advantageously the real time connection data contains the telephone number of the user. By using a fixed link such as a telephone network a real time uninterrupted communication channel can be set up.

5           The computer network is preferably the Internet so that geographical application of the method is potentially unlimited.

10           The executable program code preferably instructs the computer to search for a particular data file. This particular data file would be in a known location and known format for ease of data retrieval.

15           If the computer cannot locate a particular data file it will preferably search for real time connection data stored in alien data files. These alien data files would include data files associated with the operating system or well known applications that may require similar real time connection information for example, communication packages and Web browsers. Such an additional method makes connection set up much more user friendly.

20           The executable program code is suitably a JAVA <sup>™</sup> applet. Web pages commonly contain embedded software or executable code known as 'applets' written in the JAVA <sup>™</sup> programming language. Such applets may interact with the user to collect information, and may communicate with other processes or applications on other computers attached to the network.  
25           Using a standard language such as JAVA <sup>™</sup> which is supported by a large number of Web browsers across many different platforms gives the widest possible user base for the invention.

30           The agent may re-route the real time voice and/or image link from the user to a third party agent. This gives the agent flexibility with call allocation, for instance, if the agent's call centre is over loaded or a third party agent would better deal with the query.

35           In order to promote a fuller understanding of the above and other aspects of the invention, an embodiment will now be described, by way of example only, with reference to the accompanying drawings in which:

40           Figure 1 is a schematic diagram of users connected via the internet and telephone network to a call centre network;

            Figure 2 is a flow diagram of a connection process from the user's perspective; and

45           Figure 3 is a flow diagram of the connection process from the agent's perspective;

Two main types of user are envisaged using the web integrated telephony (WIT) system (10) of this embodiment described (Fig.1). The first is a typical home user (12) with a home telephone (14) and home computer (16) both sharing a single telephone line (18) connected to a telephone network (20). The computer (16) is connected to the telephone line (18) and telephone network (20) via a modem (22) and a large computer network (24) such as the Internet via a service provider (26). The second type of user (28) is typically more sophisticated having a computer (30) connected to the Internet (24) over a dedicated line (32) through a local area network (34) and telephone (36) connected to the telephone network (20) through a private branch exchange (PBX) (38).

An agent (40) is typically located at a call centre (40) with other agents each having a client personal computer or workstation (44) which is attached via a local area network to a server (46). Typically the server (46) and client (44) use the well known TCP/IP protocol for their communications. Each agent (40) within the call centre (42) has a telephone (48) connected to a private branch exchange (PBX) (50) which is connected to the telephone network (20) to allow access to and from the external users (12, 28). The server (46) has a computer link to the PBX, possibly through an intermediate protocol conversion system (not shown).

A third party call centre (54) and a third party agent (56) are connected to the telephone network (20) and Internet (24) to provide an alternative call answering service if necessary.

A well known and common example of the use of such an arrangement of a server (46) and PBX (50) (Fig. 1) is to provide information about a telephony caller on the terminal of the agent who is about to receive the telephony call. Thus when an incoming telephony call is received, it may be possible to identify the caller based on the calling or called number (ANI/DNIS information).

It will be appreciated that the server (46) and PBX (50) hardware illustrated in Figure 1 is very well-known in the art. One example is based on the Callpath system available from IBM, where for example the server (46) may comprise the Callpath Server/2 program running on an IBM PS/2 workstation or equivalent under the OS/2 operating system, or the AIX Callpath Server/6000 program running on a RISC System/6000 workstation. Each client (46) may comprise an IBM PS/2 workstation or equivalent running the OS/2 operating system or the Microsoft Windows operating system, and a RISC System/6000 workstation running the AIX operating system. The clients and server may communicate using the TCP/IP protocol over a Token Ring or Ethernet local area network. Further information about the Callpath products can be found in the



Callpath manuals available from IBM Corporation, such as IBM Callpath Coordinator for OS/2 and Windows General Information (order number GC22-0074) and the manuals referenced therein.

5           As shown in Figure 1, the server (46) is connected to the Internet (24). Such a connection is not required for operation as a conventional computer integrated telephony system, but is very straightforward for the skilled person to implement in view of the fact that the server already supports the TCP/IP protocol which is used for Internet communications.  
10       Such support is typically provided as part of the operating system running on the server, and is described for the AIX operating system (for example) in "AIX v4.1 System User's Guide: Communication and Network" (publication SC23-2545-01\_ and "AIX v4.1 Communications Programming Concepts" (publication SC23-2610-01) (both available from IBM  
15       Corporation).

          An example of the use of this embodiment of the invention is to enable Web initiated telephone assistance for a Web page (58) having an in-built Web Telephone Assistance (WTA) applet (60). When a browser  
20       accesses a Web page (58) which has a WTA applet (60), the applet is downloaded to the user's personal or network computer (10), and provides interaction with the user (12).

          The WTA applet (60) interacts with the computer (16) and user (12) to collect WTA data (62) such as:  
25       name, address of user, or company (62A);  
          the user's account number (62B);  
          the telephone number to call back (62C);  
          brief description of query (62D);  
30       other information such as product and the Web page.

          Some of this data may be predefined by the user in a personalised WTA user data file (64) which is searched for on the user's file system. This aids the user in entering the minimum amount of information whenever  
35       a Web page with integrated telephone assistance is accessed.

          The WTA applet (60) then establishes a communication session with a Web Call Dispatcher (WCD) programme running on a server (46) connected to the Internet (24) and the TCP/IP address of this server (46) is coded  
40       into the WTA applet (60). Each Web page (58) which provides telephony assistance (24) can have one or more associated WCD servers.

          When a TCP/IP session has been established between the user's computer (16) and the server (46), the WTA data (62), including the data  
45       from the WTA data file (64), is sent to the WCD. Additional information in the WTA data (62) includes the Web page, Universal Resource Location

(URL) (58), details of the browser environment and necessary information entered by the user.

5           The user's computer (16) under instruction from the WTA applet (60) now informs the user (12) that his/her call request has been registered and that a suitable agent (44) is being searched to deal with the request. If the tariff for the call is to be billed to the user (12) the user (12) may be asked to accept the charge. To accommodate for users who access the Internet (24) from a single telephone line (18) this  
10           message may also request the user hang-up the modem (22) connection to allow for an incoming voice call.

          The WCD programme uses the URL or the product information to locate a list of possible agents to service the request for assistance from a  
15           URL or product agent directory. The directory holds an updated list of agents, their Internet addresses, the associated telephone contact number for each Internet address, and a list of URL's or products which the agent has been trained to service, and a service category level for the URL or product (expert, etc). The server, under instruction from the WCD  
20           programme, (in order of expert priority) establishes a TCP/IP session with a Web Page Agent (WPA) application (66) running on each agent's workstation. This application presents a pop-up window on the agent's display with details of the URL, the customer query (62D) and telephone number to call (62C). The agent may then accept the request and deal  
25           with it manually (by manually calling the customer), accept the request with computer/network assisted connection, or decline the request. If the agent (44) cannot deal with the request the server tries the next agent on the list. If the agent (44) accepts the request for manual servicing, the WCS server (46) logs the request and ends processing of  
30           the query.

          In the case where the agent accepts the request with automatic connection, the following processing occurs: The agent's workstation  
35           (44) uses the URL it received from the server (46) to cause the agent's Web browser to access the relevant Web page. If this is successful, the WPA notifies the WCD server (46) that the agent can service the customer request. The WCD server (46) then uses the numbers of the agent and customer to establish a telephone connection between the two. This is  
40           achieved by the WCD server (46) communicating with a CTI (Computer Telephony Integration) server which controls a Private Branch Exchange (PBX) or Central-Office Exchange. The exchange switch calls the agent's telephone number and when answered, calls the customer number.

          The agent (44) and user (12) are now in telephone contact and are  
45           viewing the same Web page (53) allowing the agent to provide help and guidance to the customer.

As an additional function, the WCD may support the ability for the agent to transfer the call, or conference-in, another agent. In this case, the agent's workstation sends a message for expert support to the WCD which searches for an additional URL service agent. If one is found, the initial agent may be treated in a similar way to the initial customer. The expert and agent, who now both have access to the relevant URL Web page, may decide to conference the call or transfer it.

At the completion of the telephone call, the CTI server informs the WCD server which logs the call and ends processing.

The method of the embodiment will be described in terms of the steps taken by the user's computer in establishing a real-time communication link with an agent with reference to Figure 2. The user's computer establishes a link with the server over the Internet (typically the World Wide Web) when a hypertext link and URL address for the server is selected, a web page typically showing a product range may then be downloaded (102). To initiate a query the user selects a product from the Web page which starts execution of a WTA applet downloaded with the Web page (104). The user's computer, under instruction from the (WTA) applet, searches for WTA data (106) and if such data is found the user's computer prompts the user for confirmation and any other information if needed before sending the data to the server (102).

If no such WTA data is found then the user's computer, under instruction from the WTA applet searches for the necessary drivers and software to make an internet phone connection (108). The WTA applet will recognize more than one type of internet phone with their respective formats and protocols. If a recognized phone with the required user data is found then the user's computer prompts the user for confirmation and any other information (112) if needed before forwarding this data to the agent (114).

If no internet phone is located on the user's computer then the WTA applet instructs the user's computer to search files associated with other applications for the required user information (110). Such files include operating system files, modem files, auto-dial telephone files and communication package files. The user's computer prompts the user for confirmation of any user connection data found and any other information required (112) before sending this data to the server (114).

Once an agent is ready to respond the user will receive an incoming internet phone call or telephony call according to the WTA user data (118). If the user has a single phone line and no internet phone then a prompt message will be received by the user's computer for the user to go off line (116).

The method of the embodiment will also be described in terms of the steps taken by the agent's server in establishing a real-time communication link with the user with reference to Figure 3. Initially the agent's server receives a request for it's web page from the user (120) and sends out such a web page with appropriate applets to the user (122). The next stage typically involves the agent's server receiving, from the user's computer, a query on a particular product together with WTA data with details of how to set up a real time connection with the user (124). The agent server will select an appropriate agent to deal with the query and forward the query and user data to the agent's workstation (126). The server may select a third party agent call centre or a third part agent not within the local area network and forward the query and user data to the selected third party over the internet. When requested by the selected agent, the server establishes a real time communication link with the user's computer either via an internet phone or video or a telephony phone or video (128).

**CLAIMS**

1. A method of establishing a real time voice and/or image link  
between a user's computer and an agent's computer comprising the steps  
of:

the user establishing a computer network link between the user's  
computer and the agent's computer and downloading executable program code  
onto the user's computer;

the user initiating execution of the program code on the user's  
computer;

the user's computer, under the control of the program code,  
retrieving real time connection data from a data file stored on the  
user's computer and sending the real time connection data to the agent's  
computer; and

the agent initiating a real time voice or image link with the user  
using the real time connection data.

2. A method as claimed in claim 1 whereby the real-time voice or image  
link is through a telephone network and the real time connection data  
contains the telephone number of the user.

3. A method as claimed in claims 1 or 2 whereby said computer network  
is the internet.

4. A method as claimed in claims 1,2 or 3 whereby the executable code  
searches for a particular data file.

5. A method as claimed in any one of claims 1 to 4 whereby the  
executable code searches for real time connection data stored on the  
user's computer in alien data files.

6. A method as claimed in any of the preceding claims whereby the  
executable code is a Java Applet.

7. A method as claimed in any of the preceding claims whereby the  
agent reroutes the real time voice and/or image link from the user to a  
third party agent.



Application No: GB 9626923.8  
Claims searched: 1-7

Examiner: Simon Rees  
Date of search: 30 March 1997

**Patents Act 1977**  
**Search Report under Section 17**

**Databases searched:**

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:	
UK CI (Ed.O):	H4K (KF42, KF50X, KF422, KOB, )
Int CI (Ed.6):	H04M (3/42, 3/48, 3/50, 11/00, 11/06, 11/08), H04L (29/06), H04Q (3/00)
Other:	Online: WPI, INSPEC

**Documents considered to be relevant:**

Category	Identity of document and relevant passage	Relevant to claims
A	EP0740445A2 (ROCKWELL) Whole document, especially lines 39-49 of column 2.	1-7
A	WO96/38018A1 (ERICSSON) Whole document, especially from line 13 of page 4 to line 35 of page 5.	1-7
A	INSPEC Abstract No.C9608-6130G-009, Jacobs et al, "Filing HTML forms simultaneously: Co Web-architecture and functionality", Computer Networks and ISDN Systems Conference, May 1996, vol.28, no.7-11, pages 1385-95 (see abstract).	1-7
A	INSPEC Abstract No.C9608-6160D-002, Celko, "Soothsayers for Oracle [Java and Oracle tuning]", DBMS, vol.9, no.8, July 1996, pages 20-26 (see abstract).	6

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.